**Science 7 Unit D: Structures & Forces**

**Problem Solving Investigation - The Golf Ball Bridge**

NAME:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Designers face many challenges when planning a new project. One of the first things is that their design must fulfill specific criteria or specifications for the job. For example, the specifications of a bridge might be that it needs to be 20m long. If the final bridge is only 19m long, it would be useless.

**Curriculum Connection**

. Interpret examples of variation in the design of structures that share a common function, and evaluate the effectiveness of the designs

. Identify points of failure and modes of failure in natural and built structures

. Work cooperatively with team members to develop and carry out a plan, and troubleshoot problems as they arise

**The Challenge**

To build a free-standing frame bridge that supports a track capable of supporting a rolling golf ball

**Materials**

. 15-25 drinking straws

. 15 small paper clips

. 60 cm masking tape

. 1 golf ball

. scissors

**Design Specifications:**

**Please check the boxes below to indicate the specifications are met**

* The bridge must span an opening between two desks or tables that are 30cm apart
* The bridge must be free-standing. It cannot be attached to the desks or anything else
* The bridge must support a track at least 5cm above the surface of the desk
* The track must support the golf ball as it rolls from one end of the bridge to the other
* One end of the bridge must be higher than the other so the golf ball will roll easily across
* You may only use the materials provided by Mrs Kidd
* You will only have 40 minutes to construct your bridge .
* In at least three of five trials, the golf ball must successfully roll from one end of the bridge to the other without falling off
* The golf ball must roll on its own without being pushed
* The bridge must not fall over during the tests

**Plan & Construct**

. With your table group, brainstorm ideas for the design of your bridge. Each group member must contribute at least one alternative design. All designs must meet the specifications stated. The design should be sketched below:

o Decide on the design you wish to build. Please remember to label your drawing

. When the timer starts, begin to construct the bridge. If, at any time during the construction process, the group agrees that the bridge will not function properly, make adjustments in the design and note them on the sketch.

. When you have finished construction, and the 40 minutes is up, set up your bridge at the designated test site. Carry out the five trials with your classmates observing.

**Evaluate**

. You will observe and evaluate two other groups bridges and provide feedback on their design.

o How did their bridge design vary from yours?

o How effective was their design?

o Was there a point of failure in their design? If yes, propose a reason behind the failure.